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(54) Title: METHOD FOR SUBMITTING USER PROFILES TO A TELECOMMUNICATIONS NETWORK

(57) Abstract

The present invention relates to a method for submitting the user profile of a client entity which is being registered or has already registered itself with a management system of a telecommunications network. In this kind of system, for each client entity is formed at least one user profile that is stored ready for retrieval by the telecommunications network performing said registry and that during the registration of said client entity is retrieved for the use of said telecommunications network management system. According to the invention, at least one user profile is stored in the client entity to be registered and is then retrieved directly from the client entity to be registered in conjunction with the registration performed by said client entity. The user profile can be stored, e.g., in a smart card suited for attachment to the client entity to be registered.

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Method for submitting user profiles to a telecommunications network

The invention relates to a method according to the preamble of claim 1.

Methods of this category are used in conjunction with the operation of telecommunications networks for submitting a user profile of a client entity utilizing network services to the service provider's telecommunications network. The function of the user profile is to compile such information on the owner of the user profile for the use of the telecommunications network that may be used to control the content of the service to be provided to the owner of the user profile. The user profile may contain information, e.g., on such telecommunications network addresses or names to which calls placed by the owner of the user profile may be connected or, alternatively, on services made accessible to the owner of the user profile. Furthermore, the user profile may include information on payment limitations and charge rates defined for the services to be provided to the owner of the user profile. In practice, the services to be provided may be of any type related to the physical layer, data link layer, Internet or middleware layer services offered in the network.

Client entities for which user profiles can be formed belong to the groups of, e.g., private persons or firms and user applications, software agents and mobile agents. User profiles may also be formed for the nodes and subnetworks of the telecommunications network client's physical/data link layer or Internet layer. A user profile or a plurality of profiles can be submitted to the telecommunications network, e.g., when the client entity registers itself active with the network. When necessary, user profiles can be submitted after registration, too.

In the prior art, user profiles are stored in user home registers maintained by telecommunications network operators. Such user home registers form a database which is distributed between the telecommunications network operators and permits an easy verification of user profiles contained in the user home registers. Hence, while the database on the user profiles of client entities are generally maintained by

the local telecommunications service providers communicating with their subscribers, also other telecommunications network operators have an access to these data when necessary.

A problem of the prior-art technique is that when the client entity gains access to another operator's network outside the local telephone network operator's region, the user profile of the calling client entity must be retrieved from the user home register maintained by the local telecommunications network operator. This convention has the consequence that for a user, particularly for a mobile private person, mobile application, mobile node, mobile connection or mobile subnetwork, the administrative systems of telecommunications network operators must be designed for rapidly retrieving the user profile required and then transmitting the profile to a telecommunications network access connection or connections, a network service management system and a middleware service management system according to the current need of the client entity.

Due to the critical functions of mobile information transmission systems, the telecommunications network operators must acquire interoperator communication and data processing facilities that can be run with an almost real-time authentication. However, the erection and maintenance of such facilities is clumsy and steals a massive amount of resources, particularly as the number of internetwork accesses evidently tends to increase in the future. It must also be noted that telecommunications network operators communicating with each other may be located physically very remotely from each other, e.g., globally on opposite sides of the earth. Hence, conventional techniques are hampered by the time-critical operations needed between different telecommunications network operators.

It is an object of the invention to overcome the drawbacks of the above-described type and to provide an entirely novel method for submitting user profiles.

The goal of the invention is achieved by virtue of storing the user profiles at least

by their core portions in the client entity subscribing to a telecommunications service. Then, during the visit of the client entity in a nonlocal operator's telecommunications network, the client entity itself can submit its user profile to the operator of the nonlocal telecommunications network being visited.

More specifically, the method according to the invention is characterized by what is stated in the characterizing part of claim 1.

The invention offers significant benefits.

When using the method according to the invention, there is no need to fetch the user profile of the client entity visiting the nonlocal network from the user home register maintained by the operator of the local telecommunications network.

Provided that a sufficiently reliable authentication of the user profile is employed in conjunction with the method, there is no need for a real-time data transfer between the nonlocal telecommunications network and the user home register maintained by the local network when a client entity containing its own user profile attempt to register with the nonlocal network to be visited or the entity submitting its user profile for any reason to the nonlocal network.

In the following, the invention will be examined with the help of exemplifying embodiments.

In the method according to the invention, the user profile is stored in the client entity associated with the user profile. Additionally, the user profile can be stored in the databases of the telecommunications network operator issuing the user profile, that is, the local telecommunications network operator, for a possible authentication of the user profile.

When the client entity associated with the user profile visits another telecommuni-

cations network, that is, calls another network that the local network, the user profile of the client entity is submitted to the network management system of the nonlocal network directly from visiting client entity such as the client's smart card, application, terminal equipment, network node or client's network. The entity capable of having a client profile can be an entity associated with the physical layer, application layer, data link layer or Internet layer of the network. The user profile may also be configured as a private person, company or a group user profile for network or middleware use. Respectively, the user profile can be submitted to the physical layer, data link layer or Internet layer networks of the nonlocal telecommunications network operator as well as to the middleware layer of the nonlocal telecommunications network operator.

In the case that the visiting client entity is a terminal, node or network, it can be identified, e.g., from the network ID part of the network address, the network ID part of the terminal equipment or the network ID part of the network address. Respectively, a private person as a user can be identified on the basis of, e.g., a smart card and the authentication methods associated therewith. Such a smart card can also be the same smart card in which the network and middleware service profiles of the user are stored. Applications, agents and mobile agents can be authenticated with the help of the authentication methods developed for the same.

Provided that the authentication is sufficiently reliable, based on a smart card, for instance, there is no need for real-time data communications between the local network operator and the visited network operator when the visiting client entity submits its user profile to the visited network. Obviously, this arrangement can be accomplished with the presumption that the operators maintain in their local databases static register lists on stolen terminal equipment and smart cards, for instance. Herein, such static information is understood to contain data that need not be updated at a frequent rate and, particularly, not in conjunction with each registry. In practice, the static database is updated, e.g., when a piece of terminal equipment or a smart card is reported lost.

The user profiles themselves are compiled so that the local telecommunications network operator gives the client a blank user profile form which is easy to edit. This step can be accomplished using the Java applet technique, for instance. After the client has edited the required user profile attributes, the edited form is authenticated by the client's electronic signature. User profile attributes subject to editing by the user are, e.g., service and payment limitations desiredly attributed to the user profile by the user, definitions on such A subscribers that are to be answered and on those not be answered and definitions on such B subscribers that are allowed to be contacted by the client entity associated with the user profile, or respectively, not be contacted. The client may also be allowed to include a list of users permitted to use the user profile. Hence, the client need not necessarily be the actual user of the user profile. For instance, the user profile may be company-specific, whereby the client, that is, the company names the users from a group of private person users such as the company's employees, for instance. The validity time of the profile is also stored in the user profile.

After the client has edited the blank user profile forms presented by the telecommunications network operator, the filled forms are returned to the operator. If the forms are found acceptable, the filled forms are confirmed with the operator's electronic signature and the user profiles are thus ready for use. Next, the confirmed user profiles are returned back to the profile users, who can install the profiles, e.g., as files in target entities such as smart cards, applications, mobile agents, nodes, mobile network management systems or terminals. When requested, a copy of such a profile file may then be submitted to the network management system of a visited network in conjunction with a log-in registry to the visited network.

The client entity storing its own user profiles submits the required user profiles to the visited telecommunications network at the instant of registration therewith. Thus, the user profiles are immediately available to the visited network. When required, user profiles may also be submitted after registry. The visited telecommunications network verifies the validity time of the profile and the electronic

signature of the telecommunications network operator that has issued the user profile. Further, the visited network also verifies that the calling client entity or user profile is not on a blocking list. Provided that the user profile is valid, the signature is authenticated and neither the calling client entity nor the user profile is found on a blocking list, the user profile can be acknowledged which means that services compatible with the user profile will be, on request, delivered in the form defined in the user profile.

Without departing from the scope and spirit of the invention, also other embodiments different from those described above may be contemplated. For instance, a plurality of different user profiles may be stored in the smart card possessed by a private person user. Thus, a single smart card can contain, e.g., the employer's user profile and the card holder's own user profile or a plurality of such user profiles. Thus, a smart card can contain several project-specific user profiles which the employer has allocated for the use of his employee. By inserting such a multiprofile smart card in a suitable terminal, the smart card holder can use the services allocated for the desired user profile in any telecommunications network capable of supporting said services and the above-described method. Correspondingly, a plurality of different user profiles may also be stored in other kinds of client entities. When a client entity such as a unit containing a smart card has a number of user profiles stored therein, the client entity can decide in a self-contained manner which one or ones of the profiles are to be submitted to the telecommunications network.

After the client's local telecommunications network operator has allocated the required user profiles for use by the client, also the local telecommunications network operator can dispense with the need for retrieving the user profiles from the user home register maintained by the local telecommunications network operator when the client wishes to perform a log-in registration with the local network. Also in this case, the client entity can submit its user profile to the operator's network management system in conjunction with registration. In this

occasion, the local telecommunications network behaves in the same manner as a visited network in regard to the submission of a user profile.

Claims:

1. Method for submitting a user profile to a telecommunications network management system, said method comprising the step of

- forming at least one user profile for a client entity,

- storing at least one user profile for retrieval by the telecommunications network, and

- retrieving at least one of the stored user profiles for use by the telecommunications network management system,

characterized by

- storing at least one of the user profiles in the client entity, and

- retrieving at least one of the stored user profiles from the client entity.

2. Method according to claim 1, characterized in that each one of the user profiles is formed in cooperation between the client and the telecommunications network operator issuing the user profile, said cooperation comprising the steps of

- sending a blank user profile form from the telecommunications network operator's system issuing user profiles to the client,

- editing said blank user profile form in the client's system,

- submitting the edited user profile form back to the telecommunications networks operator's system issuing user profiles,

- verifying the edited user profile form in the telecommunications network operator's system issuing user profiles, and

- provided that the user profile represented by the edited user profile form is found acceptable:

  - accepting the user profile represented by the edited user profile form in the telecommunications network operator's system issuing user profiles, and

  - returning the accepted user profile from the telecommunications network operator's system issuing user profiles back to the client.

3. Method according to claim 2, characterized in that, after the acceptance of the user profile and prior to the return of the same back to the client, the user profile is authenticated by the electronic signature of the telecommunications network operator.

4. Method according to any of claims 1 - 3, characterized in that the user profile is complemented with information on the charge, service and/or call restrictions related to the client entity.

5. Method according to any of claims 1 - 4, characterized in that the user profile is complemented with information on the charging of services subscribed to by client entity.

6. Method according to any of claims 1 - 5 for use in conjunction with such a client entity that includes a smart card interface and a smart card connected to said interface, c h a r a c t e r i z e d in that at least one user profile is stored in said smart card to be interfaced with said client entity.

7. Method according to claim 6, c h a r a c t e r i z e d in that in said smart card are stored at least two, mutually alternative user profiles.

8. Method according to any of claims 1 - 5, c h a r a c t e r i z e d in that at least one user profile is stored as a file in an application, a mobile agent, a node, a mobile network management system or a terminal.

9. Method according to any of claims 1 - 8 for use in conjunction with the registry of a client entity in a telecommunications network, c h a r a c t e r i z e d by the steps of

- verifying the user profile retrieved from the client entity seeking registration with the registration system of a telecommunications network allocating registrations, and provided that said user profile is found acceptable:

  - accepting the user profile, and

  - submitting the accepted user profile for use by the service management system of the telecommunications network accepting the registry.

10. Method according to claims 3 and 9, c h a r a c t e r i z e d in that, in conjunction with the verification of the user profile retrieved from the client entity seeking registry with the registration system of a telecommunications network allocating registrations, the steps are carried out comprising

- verifying the validity time of the user profile, the electronic signature of the telecommunications network operator that has issued the user profile, and the blocking list of user profiles, and

- if the validity time of the user profile has expired, said electronic signature is incorrect or the user profile is found from said blocking list of user profiles, rejecting the user profile.

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 3/42
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5675628 A (PETRI HOKKANEN), 7 October 1997 (07.10.97), see background & summary of the invention --	1-10
Y	WO 9803005 A1 (EUROPOLITAN AB), 22 January 1998 (22.01.98), see description of the invention --	1-10
Y	WO 9423523 A1 (NOKIA TELECOMMUNICATIONS OY), 13 October 1994 (13.10.94), page 1 - page 4 -- --------	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Information on patent family members

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